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EXAMINER	
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2473	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/731,091	FISHER ET AL.	
	Examiner	Art Unit	
	CANDAL ELPENORD	2473	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-9,13,14,17,19 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5-9, 13-14, 17, 19-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-22 have been considered but are moot in view of the new ground(s) of rejection.

2. Claims 1, 5-6, 13-14, 17, 19 have been amended. Claims 4, 10-12, 18 and 21-22 have been cancelled.

3. The Applicants alleged that the applied references fail to teach " establishing a mesh of virtual circuits to emulate VPLS by attaching virtual circuits to pairs of PEs, each of the pairs in the mesh comprising a first PE and second PE".

In response, the Examiner respectfully disagrees because Stone '057 teaches the idea of establishing of " a full mesh of virtual connections" in an ATM network (col. 3, lines 32-43) in order to set up VLAN connections. The Examiner respectfully asserts "full mesh of virtual connections" encompasses virtual circuits since ATM is connection oriented. Further, for a connection to be set up in an ATM network a virtual circuit is allocated for the connection.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 6-9, 13-14** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 6, the limitation "determining whether the PE is to set the virtual circuit with the ATM address" recited in line 25-26 is vague and indefinite because it is not clear as to which Provider Edge (PE) sets the virtual circuit with the ATM address.

Regarding claim 13, similar problem exist inline 22-23.

Claims 7-9, 14 are rejected by virtue of their dependency on respective base claims 6, 13.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any

inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. **Claims 1-3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Holmgren et al. (US 7,113,512 B1), and further view of Stone et al (US 6,041,057), Sugiyama et al (US 6,967,954 B2) and Ginipalli et al (US 7,292,577 B1).

Regarding claim 1, Kermarec et al. discloses a method ("virtual LAN service", recited in abstract, lines 1-7) of emulating Virtual Provide Local Area Network Service (VPLS) , comprising the steps of: configuring ("interconnected of plurality of PEs", recited in paragraph 0020, lines 1-9) at a plurality of provider edge devices (PEs) (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5) a VPLS (fig. 3, VALN 3,5 to VLAN 3,7, recited in paragraph 0052) arranged in a Private Network-Network Interface (PNNI) hierarchy (fig. 1 to fig. 3, see plurality of PE devices as the PNNI hierarchy) having a VPLS Identifier (ID) (VLAN id, recited in paragraph 0025 and 0018); establishing a respective virtual circuit ("establishing a virtual circuit", recited in paragraph 0019, lines 1-5) between the pair of PEs ("virtual circuits between PEs", recited in paragraph 0025) of each PE (fig. 2, PE-1, recited in paragraph 0044, lines 1-10) as endpoints of the virtual circuit ("means for establishing a

virtual circuit for a PE, recited in paragraph 0036, lines 1-4), wherein a first PE of the pair of PEs determines whether the first is to initiate the circuit such that only one PE of the pair of PEs establishes the virtual circuit ("detecting whether a pair of Customer Edge devices belong to two PE devices, in response, establishing one virtual circuit", paragraphs 0022-0023).

Regarding claim 2, the method ("virtual LAN service", recited in abstract, lines 1-7), wherein at each PE (fig. 2, PE-1, recited in paragraph 0044, lines 1-10).

Regarding claim 3, the method ("virtual LAN service", recited in abstract, lines 1-7), wherein a second VPLS ("means for communicating with other PE and VLAN", recited in paragraph 0029, lines 1-10) is emulated at a plurality of the PEs (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5);

Kermarec et al. discloses all the subject matter of the claimed invention with the exception of being silent with respect to the following features: **regarding claim 1**, the ATM address, **regarding claim 2**, the respective ATM address associated with VPLS is unique to the VPLS, **regarding claim 3**, the respective ATM address associated with the VPLS is also associated with the second VPLS.

However, Holmgren et al (US 7,113,512 B1) in a similar field of endeavor discloses the following features:

Regarding claim 1, discloses the ATM address (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6), the respective ATM address associated with VPLS is unique to the VPLS) associated with VLAN ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45).

Regarding claim 2, the respective ATM address (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6) , the respective ATM address associated with VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45) is unique to the VPLS (fig. 3, Mapping Table, Plurality of VLAN such as VLAN 100, VLAN 200 associated with a unique PVC, recited in col. 5, lines 4-21).

Regarding claim 3, the respective ATM address (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6) associated with the VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45) is also associated with the second VPLS (fig. 3, VLAN 200 Tag in mapping table 24 and 46, recited in col. 5, lines 6-22).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Kermarec et al. by using features as taught by Holmgren et al. in order to provide address resolution when sending frames/packets from a network to another network when there are different protocols in use (See col. 2, lines 37-66 for motivation).

Holmgren '512 and Kermarec '268 disclose all the claimed limitations as set forth with the exception of being silent with respect to claimed features: at each PE, generating a PNNI Topology State Element (PTSE) including a VPLS Information Group (IG), the VPLS IG indicating the VPLS ID and an ATM address associated with the VPLS; flooding each VPLS IG throughout the PNNI hierarchy to exchange information between the PEs; is establishing a mesh of virtual circuits in the ATM network to emulate VPLS by attaching virtual circuits to pairs of PEs, each of the pairs of PEs in the mesh comprising a first PE and a second PE, wherein establishing each virtual circuit between the first PE and the second PE comprises:

However, Stone '057 from a similar field of endeavor discloses the above claimed features:

Regarding claim 1, at each PE (fig. 1, Edge Switches 10 connecting to the ATM Network 60, col. 4, lines 50-60), generating a PNNI Topology State Element (PTSE) (noted: sharing of topology information including switch identifiers and VLAN information, col. 2, lines 38-48, "means to advertise topology information", col. 5, lines 27-39) including a VPLS Information Group (IG) (noted: sharing of topology information including switch identifiers and VLAN information, col. 2, lines 38-48), the VPLS IG indicating the VPLS ID and an ATM address associated with the VPLS (noted: VLAN identifiers corresponding to ATM port identifiers, col. 3, lines 60-67); flooding each VPLS IG throughout the PNNI hierarchy to exchange information between the PEs (noted: periodic forwarding of topology messages to neighboring switches, col. 5, lines

27-39); establishing a mesh of virtual circuits in the ATM network to emulate VPLS by attaching virtual circuits to pairs of PEs (see, establishing of a full mesh of virtual connections from source switches to destination switches with VLAN identifiers, col. 3, lines 32-43), each of the pairs of PEs in the mesh comprising a first PE and a second PE (fig. 1, Edge switches 10, 40 in the ATM network), wherein establishing each virtual circuit between the first PE and the second PE (see, establishing of a full mesh of virtual connection from source switches to destination switches with VLAN identifiers based on requests for virtual connection, col. 3, lines 32-43, col. 6, lines 32-51) comprises;

In view of the above, having the combined teaching features of Kermarec "268, Holmgren '512, and the having the methods for configuring and maintaining connectivity in ATM network of Stone '057, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teaching features of Kermarec "268, Holmgren '512 by using teaching features as taught by Stone '054 in order to provide virtual mesh connections using VLAN identifiers associated with ATM addresses as suggested in col. 3, lines 35-40.

The combination of Kermarec '268, Holmgren '512 and Stone discloses all the claimed limitations with the exception of claimed features:

Regarding claim 1, selecting the first PE and the second PE for the virtual circuit when the first PE determines that the second PE supports the VPLS ID; determining whether the first PE or the second PE should initiate the virtual circuit; automatically establishing the virtual circuit between the first PE and the

second PE using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 1, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, having the combined teaching features of above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Holmgren '512 with Kermarec '268, Stone '057 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

The combination above discloses all the claimed limitations with the exception of claimed features:

Regarding claim 1, wherein the victual circuit comprises a traffic characteristics equal to the minimum traffic characteristics of the first PE and the second PE.

However, Ginipalli '577 from a similar field of endeavor discloses the above claimed features:

Regarding claim 1, wherein the virtual circuit has a traffic characteristic equal to a minimum traffic characteristic (see, virtual connection with constant bit rate, col. 3, lines 54-67) of the first PE and the second PE (see, mapping of virtual connections traffic at the device with different classes of service based on VLAN Id and priority, col. 5, lines 38-67, fig. 6, see plurality of VLAN associated VPI, VCI and classes of service (i.e. CBR, VBR and UBR), col. 5, lines 12-37).

In view of the above, having the combined teaching features of Kermarec '268, Holmgren '512, Stone '057 and Sugiyama '954, the teaching features of Ginipalli '577, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teaching features of

Kermarec '268, Holmgren '512, Stone '057 and Sugiyama '954 by using teaching features as taught by Ginipalli '577 in order to provide differentiated services based on VLAN Ids and VLAN priority as suggested in col. 2, lines 61 to col. 3, lines 3.

10. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Holmgren et al. (US 7,113,512 B1), Stone et al (US 6,041,057), Sugiyama et al (US 6,967,954 B2) and Ginipalli et al (US 7,292,577 B1) as applied to claim 1 above, and further in view of Frelechoux et al (US 2002/0023163 A1).

The combined teaching features of Kermarec '268, Holmgren '512, Stone '057, Sugiyama '954 and Ginipalli '577 discloses all the claimed limitations except claimed features:

Regarding claim 5, at each PE, flooding the PTSE throughout a peer group of the PE, each peer group having a peer group leader; at each peer group leader, receiving each PTSE generated by a PE within the peer group of the peer group leader and flooding such PTSEs throughout a parent logical group of the peer group leader; at each peer group leader, receiving at least one other PTSE, each other PTSE containing a VPLS IG indicating an association between the VPLS ID and an ATM address, from the parent logical group of the peer group leader; and at each peer group leader, flooding the at least one other PTSE throughout the peer group of the peer group leader.

However, Frelechoux '163 from the same field of endeavor discloses the above claimed features:

regarding claim 5, flooding the PTSE ("flooding PTSE", recited in paragraph 0003, lines 1-9) throughout a peer group ("flooding among nodes of peer group", recited in paragraph 0003), each peer group ("one peer group serving as a peer group leader", recited in paragraph 0002, lines 4-22) having a peer group leader ("one peer group serving as a peer group leader", recited in paragraph 0002, lines 4-22), at each peer group leader ("peer group leader", recited in paragraph 0002, lines 4-22), receiving each PTSE generated ("PTSEs generated by a logical group node", recited in paragraph 0003, lines 11-21) within the peer group ("one peer group serving as a peer group leader", recited in paragraph 0002, lines 4-22) of the peer group leader ("one peer group serving as a peer group leader", recited in paragraph 0002, lines 4-22) and flooding such PTSEs ("generation of PTSEs and flooding", recited in paragraph 0003, lines 11-21) throughout a parent logical group of the peer group leader ("peer group leader", recited in paragraph 0002, lines 4-22); at each peer group leader ("peer group leader", recited in paragraph 0002, lines 4-22 and); receiving at least one other PTSE ("PTSEs receives form it neighbors", recited in paragraph 0003, lines 11-22), each other PTSE ("receiving other PTSE form other group leader", recited in paragraph 0043, from the parent logical group ("PTSEs generated by a logical group node", recited in paragraph 0003, lines 11-21) of the peer group leader ("peer group leader", recited in paragraph 0002, lines 4-22) ; and at each peer group leader ("peer group leader", recited in paragraph 0002, lines 4-22),

flooding the at least one other PTSE throughout the peer group ("flooding back down to low level nodes", recited in paragraph 0003, lines 11-21) of the peer group leader ("peer group leader", recited in paragraph 0002, lines 4-22).

In view of the above, having the combined teaching features of Kermarec '268, Holmgren '512, Stone '057, Sugiyama '954 and Ginipalli, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Kermarec '268, Holmgren '512, Stone '057, Sugiyama '954 and Ginipalli '577 by using features as taught by Frelechoux '163 in order to provide managerial function in PAR enabled device as suggested in paragraph 0009-0012.

11. **Claims 6-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Stone et al (US 6,041,057) and further view of Frelechoux et al (US 2002/0023163 A1), Sugiyama et al (US 6,967,954 B2) and Ginipalli et al (US 7,292,577 B1).

Regarding claim 6, Kermarec '268 discloses a method ("virtual LAN service", recited in abstract, lines 1-7) of emulating Virtual Provide Local Area Network Service (VPLS) comprising the steps: configuring ("interconnected of plurality of PEs", recited in paragraph 0020, lines 1-9) at a plurality of provider edge devices PEs (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5), a VPLS (fig. 3, VALN 3,5 to VLAN 3,7, recited in paragraph 0052) having VPLS Identifier (ID) (VLAN id, recited in paragraph 0025 and 0018), for each pair of PEs (fig. fig. 2, PE-1 and PE-2, recited in paragraph

0044, lines 1-10), establishing a respective virtual circuit ("establishing a virtual circuit", recited in paragraph 0019, lines 1-5) between the pair of PEs ("virtual circuits between PEs", recited in paragraph 0025) of each PE (fig. 2, PE-1, recited in paragraph 0044, lines 1-10) as endpoints of the virtual circuit ("means for establishing a virtual circuit for a PE, recited in paragraph 0036, lines 1-4), the VPLS IG ("VC labels", recited in paragraph 0053) indicating the VPLS ID ("virtual ID", recited in paragraph 0049 and paragraph 0053).

Regarding claims 7, a method ("virtual LAN service", recited in abstract, lines 1-7), wherein other PE ("means for communication with other PEs", recited in paragraph 0029).

Kermarec '268 discloses all the claimed limitations with the exception of claimed features:

Regarding claim 6, the ATM network (Asynchronous Transfer Mode), associating an ATM address with the VPLS ID; at each PE, generating a Private Network-Network Interface (PNNI) Augmented Routing (PAR) Service IG including the VPLS ID, an ATM address associated with the VPLS, and a traffic characteristic associated with both the VPLS ID and the ATM address; advertising the association between the VPLS ID and the ATM address to other nodes within the ATM network; flooding each PAR Service IG throughout the ATM network; establishing a mesh of virtual circuits in the ATM network to emulate VPLS by attaching virtual circuits to pairs of PEs, each of the pairs of PEs in the mesh comprising a first PE and a second PE, wherein establishing each virtual circuit between the first PE and the second PE; determining other

ATM addresses within the ATM network which are associated with the VPLS; for each such other ATM address, for each such other ATM address, determining whether the PE is to set up a virtual circuit with the ATM address.

However, Stone '057 from the same field of endeavor discloses the above claimed features:

Regarding claim 6, the ATM network (Asynchronous Transfer Mode) (fig. 1, ATM network 60 with interconnected switches which are associated with VLANs, col. 4, lines 50 to col. 5, lines 16), associating an ATM address with the VPLS ID(noted: VLAN identifiers corresponding to ATM port identifiers, col. 3, lines 60-67); at each PE, generating a Private Network-Network Interface (PNNI) Augmented Routing (PAR) Service IG including the VPLS ID, an ATM address associated with the VPLS (noted: VLAN identifiers corresponding to ATM port identifiers, col. 3, lines 60-67), and a traffic characteristic associated with both the VPLS ID and the ATM address (see, advertising of network topology information where the topology information includes path cost and VLAN identifiers, col. 5, lines 27-39); advertising the association between the VPLS ID and the ATM address to other nodes (noted: periodic forwarding of topology messages to neighboring switches, col. 5, lines 27-39); within the ATM network (fig. 1, ATM network 60 with interconnected switches which are associated with VLANs, col. 4, lines 50 to col. 5, lines 16); flooding each PAR Service IG throughout the ATM network; establishing a mesh of virtual circuits in the ATM network to emulate VPLS by attaching virtual circuits to pairs of PEs (see, establishing of a full mesh of virtual connections from source switches to destination switches with VLAN

identifiers, col. 3, lines 32-43), each of the pairs of PEs in the mesh comprising a first PE and a second PE (fig. 1, Edge switches 10, 40 in the ATM network), wherein establishing each virtual circuit between the first PE and the second PE (see, establishing of a full mesh of virtual connection from source switches to destination switches with VLAN identifiers based on requests for virtual connection, col. 3, lines 32-43, col. 6, lines 32-51); determining other ATM addresses within the ATM network which are associated with the VPLS (see, learning from topology information advertised such VLAN tag identifiers associated with ATM outbound ports, col. 6, lines 62 to col. 7, lines 30); for each such other ATM address, determining whether the PE is to set up a virtual circuit with the ATM address (see, setting up of multipoint virtual connections to a switch, col. 8, lines 47-54).

In view of the above, having the methods of establishing virtual circuits at a provider edge network over VLAN of Kermarec '268, and the methods for configuring and maintaining connectivity utilizing an ATM network of Stone '054. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Kermarec '268 by using teaching features (i.e. substituting the ATM network in place of the carrier network) as taught by Stone '057 in order to establish virtual mesh connections using VLAN identifiers associated with ATM addresses as suggested in col. 3, lines 35-40.

The combination of Kermarec '268, Stone '054 discloses all the claimed limitations with the exception of claimed features:

Regarding claim 6, generating a PPNI Augmented Routing (PAR) Service IG, flooding each PAR Service IG throughout the ATM network.

Regarding claim 7, the method, wherein at least one other PE uses Proxy PAR to exchange PEs ATM address to be associated with the VPLS.

However, Frelechoux '163 in a similar field of endeavor discloses the following features:

regarding claim 6, generating a PPNI Augmented Routing ("employing PPNI PAR, recited in paragraph 0005, lines 10-14 and lines 19-29 and "flooding to other ATM switches", recited in paragraph 0007) (PAR) Service IG ("PAR Client Services", recited in paragraph 0006, lines 10-23), flooding ("flooding to other ATM switches", recited in paragraph 0007) each PAR Service IG ("check of ATM address of IP service", recited in paragraph 0019, lines 1-5) throughout the ATM network ("ATM cloud", recited in paragraph 0007, lines 7-9).

Regarding claim 7, uses Proxy PAR ("use of PAR for communicating of protocol information between devices", recited in paragraph 0008, lines 1-13) to exchange ATM address ("register and exchange of routing information", recited in paragraph 0007, lines 17-25).

In view of the above, having the combined teaching features of Kermarec '268, Stone '057, and methods and apparatus for providing managerial information in PPNI hierarchical network where a PAR enabled device receives topology statements (i.e. PTSEs) of Frelechoux '163, it would have been obvious

to one ordinary skill in the art at the time the invention was made to modify the features of Kermarec '268 with Holmgren '512, Ginipalli '577 by using features as taught by Frelechoux et al. in order to provide managerial function in PAR enabled device as suggested in paragraph 0009-0012 for motivation.

The combination of Kermarec '268, Stone '057 and Frelechoux '163 discloses all the claimed limitations with the exception of claimed features:

Regarding claim 6, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; determining other ATM addresses within the ATM network which are associated with the VPLS; for each such other ATM address, determining whether the PE is to set up a virtual circuit with the ATM address; and automatically establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit, wherein the victual circuit comprises a traffic characteristics equal to the minimum traffic characteristics of the first PE and the second PE.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 6, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20

based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and automatically establishing the virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46, fig. 4 to fig. 5, traffic classes CBR, UBR, VBR associated with virtual circuits).

In view of the above, having the combined teaching features of above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Kermarec '268 with Stone '057, Frelechoux '163 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

The combination above discloses all the claimed limitations with the exception of claimed features:

Regarding claim 6, wherein the victual circuit comprises a traffic characteristics equal to the minimum traffic characteristics of the first PE and the second PE.

However, Ginipalli '577 from a similar field of endeavor discloses the above claimed features:

Regarding claim 6, wherein the virtual circuit has a traffic characteristic equal to a minimum traffic characteristic (see, virtual connection with constant bit rate, col. 3, lines 54-67) of the first PE and the second PE (see, mapping of virtual connections traffic at the device with different classes of service based on VLAN Id and priority, col. 5, lines 38-67, fig. 6, see plurality of VLAN associated VPI, VCI and classes of service (i.e. CBR, VBR and UBR), col. 5, lines 12-37).

In view of the above, having the combined teaching features of Kermarec '268, Stone '057 and Sugiyama '954, the teaching features of Ginipalli '577, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teaching features of Kermarec '268, Stone '057 and Sugiyama '954 by using teaching features as taught by Ginipalli '577 in order to provide differentiated services based on VLAN Ids and VLAN priority as suggested in col. 2, lines 61 to col. 3, lines 3.

12. **Claims 8-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Stone et al (US 6,041,057), Frelechoux et al (US 2002/0023163 A1), Sugiyama et al (US

6,967,954 B2), Ginipalli et al (US 7,292,577 B1) as applied to claim 7above, and further view of Rochberger (US 6,456, 600 B1).

The combination of Kermarec '268, Stone '057, Frelechoux '163 and Sugiyama '954, Ginipalli '577 discloses all the subject matter of the claimed invention with the exception of features: **regarding claim 8**, an ATM link employing an ATM User Network Interface (UNI) signaling protocol, **regarding claim 9**, an ATM link employing an ATM Inter-Network Interface (AINI) signaling protocol.

However, Rochberger '600 from the same field of endeavor discloses the above claimed features:

Regarding claim 8, an ATM link ("interconnect ATM user to a ATM switch", recited in col. 1, lines 53-59 and col. 1, lines 25-32) employing an ATM User Network Interface (UNI) signaling protocol ("UNI signaling mechanisms for multipoint connections", recited in col. 2, lines 16-23).

Regarding claim 9, an ATM link ("interconnect ATM user to a ATM switch", recited in col. 1, lines 53-59 and col. 1, lines 25-32) employing an ATM Inter-Network Interface (AINI) signaling protocol ("AINI", recited in col. 8, lines 25-55).

Therefore, it would have been obvious to one of ordinary skill in art at the time the invention was made to modify the features of Kermarec '268 with Stone '057, Frelechoux '163, Sugiyama '954 and Ginipalli '577 by using the well known ATM standards as disclosed by Rochberger '600 in order to provide interconnection to ATM devices as suggested in col. 1, lines 30-col. 2, lines 1-15.

13. **Claims 13-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Holmgren et al (US 7,113,512 B1) in further view of Stone et al (US 6,041,057), Sugiyama et al (US 6,967,954 B2) and Ginipalli et al (US 7,292,577 B1).

Regarding claim 13, Kermarec et al. discloses a method ("virtual LAN service", recited in abstract, lines 1-7) of emulating Virtual Provide Local Area Network Service (VPLS) comprising the steps: configuring ("interconnected of plurality of PEs", recited in paragraph 0020, lines 1-9) at a plurality of provider edge devices PEs (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5), a VPLS (fig. 3, VALN 3,5 to VLAN 3,7, recited in paragraph 0052) having VPLS Identifier (ID) (VLAN id, recited in paragraph 0025 and 0018), for each pair of PEs (fig. fig. 2, PE-1 and PE-2, recited in paragraph 0044, lines 1-10), establishing a respective virtual circuit ("establishing a virtual circuit", recited in paragraph 0019, lines 1-5) between the pair of PEs ("virtual circuits between PEs", recited in paragraph 0025) of each PE (fig. 2, PE-1, recited in paragraph 0044, lines 1-10) as endpoints of the virtual circuit ("means for establishing a virtual circuit for a PE, recited in paragraph 0036, lines 1-4), advertising the association between the VPLS ID ("flooding of VLAN id to other PEs", recited in paragraph 0027, lines 1-14).

Regarding claim 14, the method ("virtual LAN service", recited in abstract, lines 1-7), wherein the steps of setting up a virtual circuit ("means for establishing a virtual circuit for a PE, recited in paragraph 0036, lines 1-4).

Kermarec '268 is silent with respect to the following features: **regarding claim 13**, the ATM network, advertising the association between the VPLS ID and the ATM address to other nodes within the ATM network; determining other ATM addresses within the ATM network which are associated with the VPLS, set up virtual circuit with the ATM address.

However, Holmgren '512 in a similar field of endeavor discloses the following features:

Regarding claim 13, the ATM network (fig. ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6), advertising (fig. 2, "Broadcast ARP and floods", recited in col. 3, lines 60-65) the ATM address ("resolved addresses and facilitate of transmission", recited in col. 4, lines 20-29) to other nodes (fig. 1, nodes 28, 30, 32, recited in col. 4, lines 20-29) within the ATM network (fig. ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6); determining other ATM addresses ("determining the VLAN tag to an ATM PVC", recited in col. 3, lines 60-67 and col. 4, lines 1-6) within the ATM network (fig. ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6), which are associated with the VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45), set up virtual circuit with the ATM address ("mapping of VLAN tag to corresponding ATM PVC", recited in col. 5, lines 6-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Kermarec et al. by using features ("interconnecting the ATM network to the Carrier Network) as

taught by Holmgren et al. in order to provide address resolution when sending frames/packets from a network to another network when there are different protocols in use (See col. 2, lines 37-66 for motivation).

Kermarec "268, Holmgren '512 teaches al the claimed limitations with the exception of claimed features:

Regarding claim 13, including advertising at least one traffic characteristic to be associated with the VPLS ID and the ATM address, generating a PNNI Topology State Element (PTSE) including a VPLS information group (IG), the VPLS IG indicating the VPLS ID and the ATM address associated with the VPLS; flooding the PTSE throughout the peer group of the node; and establishing a mesh of virtual circuits in the ATM network to emulate VPLS by attaching virtual circuits to pairs of PEs, each of the pairs of PEs in the mesh comprising a first PE and a second PE, wherein establishing each virtual circuit between the first PE and the second PE comprises: for each such other ATM address, determining whether the PE is to set up a-the virtual circuit with the ATM address.

However, Stone '057 from the same field of endeavor discloses the above claimed features:

Regarding claim 13, including advertising at least one traffic characteristic to be associated with the VPLS ID and the ATM address (see, advertising of network topology information where the topology information includes path cost and VLAN identifiers, col. 5, lines 27-39), generating a PNNI Topology State Element (PTSE) (noted: sharing of topology information including

switch identifiers and VLAN information, col. 2, lines 38-48, "means to advertise topology information", col. 5, lines 27-39) including a VPLS information group (IG) (noted: VLAN switches with unique identifier, col. 5, lines 1-20+, fig. 4, VLAN ID, col. 9, lines 34-41), the VPLS IG indicating the VPLS ID and the ATM address associated with the VPLS (noted: VLAN identifiers corresponding to ATM port identifiers, col. 3, lines 60-67); flooding the PTSE throughout the peer group of the node (noted: periodic forwarding of topology messages to neighboring switches, col. 5, lines 27-39); and establishing a mesh of virtual circuits in the ATM network to emulate VPLS by attaching virtual circuits to pairs of PEs (see, establishing of a full mesh of virtual connections from source switches to destination switches with VLAN identifiers, col. 3, lines 32-43), each of the pairs of PEs in the mesh comprising a first PE and a second PE (fig. 1, Edge switches 10, 40 in the ATM network), wherein establishing each virtual circuit between the first PE and the second PE (see, establishing of a full mesh of virtual connections from source switches to destination switches with VLAN identifiers, col. 3, lines 32-43) comprises: for each such other ATM address, determining whether the PE is to set up the virtual circuit with the ATM address (see, setting up of multipoint virtual connections to a switch, col. 8, lines 47-54).

In view of the above, having the combined teaching features of Kermarec '268 with Holmgren '512 and the method configuring connectivity in an ATM network using VLAN identifiers of Stone '057, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teaching features of Kermarec '268 with Holmgren '512 by using

teaching features as taught by Stone '057 in order to provide virtual connection based on topology messages as suggested in col. 2, lines 37-48.

The combination of Kermarec '268, Holmgren '512 and Stone '057 teaches all the claimed limitations with the exception of claimed features:

Regarding claim 13, flooding the PTSE throughout the peer group of the node; generating a Private Network-Network Interface (PNNI) Augmented Routing (PAR) Service information group (IG) including the VPLS ID and the ATM address: flooding the PAR Service IG throughout the ATM network.

However, Frelechoux '163 from a similar field of endeavor discloses the above claimed features:

Regarding claim 13, flooding the PTSE throughout the peer group of the node (see, "flooding PTSE among nodes of peer group", paragraph 0003); generating a Private Network-Network Interface (PNNI) Augmented Routing (PAR) Service information group (IG) (see, PPNI PAR, paragraph 0005, lines 10-14, 19-29 and "flooding tom other ATM switches", paragraph 007) including the VPLS ID and the ATM address (see, PAR client services associated with ATM address, paragraph 0006, lines 10-23, 0019, lines 1-5); flooding the PAR Service IG throughout the ATM network (see, flooding to other ATM switches, paragraph 0007).

In view of the above, having the combined teaching features of Kermarec '268 with Holmgren '512 and Stone '057, and the teaching features of Frelechoux '231, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teaching features Kermarec '268

with Holmgren '512 and Stone '057 by using teaching features as taught by Frelechoux '163 in order to provide managerial function as suggested in paragraph 0009-0012.

The combination of Kermarec '268 with Holmgren '512 and Stone '057, and Frelechoux '163 discloses all the claimed limitations with the exception of claimed features:

Regarding claim 13, selecting the first PE and the second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; and automatically establishing the virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 13, selecting the first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and the second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function

for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and automatically establishing the virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, having the combined teaching features of above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Kermarec '268 with Holmgren '512, Stone '057, and Frelechoux '163 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

The combination of Kermarec '268 with Holmgren '512, Stone '057, Frelechoux '23, and Sugiyama '954 discloses all the claimed limitations with the exception of claimed features:

Regarding claim 13, wherein the circuit comprises a traffic characteristic equal to a minimum of the one traffic characteristic and a second traffic characteristic associated with other ATM address.

Regarding claim 14, wherein the step of setting up a virtual circuit comprises setting up the virtual circuit in conformance with the at least one traffic characteristic.

However, Ginipalli '577 from the same field of endeavor discloses the above claimed features:

Regarding claim 13, at least one traffic characteristic to be associated with the VPLS ID and the ATM address (fig. 4 in combination with fig. 5, see, plurality of VLAN Ids associated with VPI/VPC and associated class of services which include CBR, VBR, UBR, col. 5, lines 12-37), wherein the circuit comprises a traffic characteristic equal to a minimum of the one traffic characteristic and a second traffic characteristic associated with other ATM address (noted: mapping of virtual connections as the traffic arrives at the device with different classes of service based on VLAN Id/priority, col. 3, lines 54 to col. 6, lines 15, fig. 6, col. 5, lines 38-56).

Regarding claim 14, wherein the step of setting up a virtual circuit comprises setting up the virtual circuit in conformance with the at least one traffic characteristic (noted: setting up of virtual connect with a constant bit rate, col. 3, lines 54-67, see fig. 4 to fig. 6, which associations of different classes of service with Virtual Circuit/Virtual Path and VLAN IDs).

In view of the above, having the combined teaching features of Kermarec '268, Holmgren '512, Stone '057, Frelechoux '23, Sugiyama '954, and the method for establishing VLAN connection based on service classes of Ginipalli '577, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined teaching features of Kermarec '268 with Holmgren '512, Stone '057, Frelechoux '23, Sugiyama '954 by using features as taught by Ginipalli '577 in order to provide differentiated services

based on VLAN IDs and VLAN priority as suggested in col. 2, lines 61 to col. 3, lines 3 for motivation.

14. **Claims 17, 19-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Holmgren et al (US 7,113,512) in view of Stone et al (US 6,041057), and further view of Kermarec et al (US 2003/0110268 A1), Frelechoux et al (US 2002/0023163 A1) and Sugiyama et al (US 6,967,954 B2).

Regarding claim 17, Holmgren '512 discloses a node (fig. 1, Edge devices/nodes 30, 28 and 32, recited in col. 3, lines 54-60) within an Asynchronous Transfer Mode (ATM) network (fig. 2, ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6), wherein the node is part of a Private Network-Network Interface (PNNI) hierarchy (fig. 1, Edge devices/nodes 30, 28 and 32, recited in col. 3, lines 54-60), comprising: means ("receiving VLAN Tag", recited in col. 6, lines 3-11) for receiving a Virtual Private Local Area Network Service (VPLS) identifier (ID) ("VLAN Tag associated with ATM address", recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45), a VPLS controller (fig. 2 and fig. 3, VLAN Mapping table-EIWS 24, recited in col. 3, lines 54-67 and col. 4, lines 1-6) comprising a computer-readable medium encoded with instructions, the computer-readable medium comprising: instructions for associating an ATM address with the VPLS ID ("VLAN Tag associated with ATM address", recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45), instructions(fig. 2, "Broadcast ARP and floods", recited in col. 3, lines 60-65) for receiving a service identifier

(ID identifying a service ("VLAN Tag associated with ATM address", recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45); instructions for determining ("determining destination address among multiple PVCs", recited in col. 5, lines 6-13) other ATM addresses within the ATM network (fig. 2, ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6) which are associated with the VPLS ID ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45); instruction for, for each such other ATM address (fig. 1, plurality of ATM destination routers 14,16, and 18, recited in col. 3, lines 44-53), determining whether the node (fig. 1, Edge devices, 28,30, and 32, recited in col. 3, lines 44-53) is to set up a virtual circuit ("mapping to corresponding PVC", recited in col. 5, lines 5-13) with other ATM address (fig. 1, Plurality of PVCs in the VLAN mapping table, recited in col. 3, lines 44-53); and instructions, for, for each such other ATM address (fig. 1, plurality of ATM destination routers 14,16, and 18, recited in col. 3, lines 44-53) that the node (fig. 1, Edge devices, 28,30, and 32, recited in col. 3, lines 44-53) determines that the node (fig. 1, Edge devices, 28,30, and 32, recited in col. 3, lines 44-53) is to set up a virtual circuit ("mapping to corresponding PVC", recited in col. 5, lines 5-13), setting up a virtual circuit ("mapping to corresponding PVC", recited in col. 5, lines 5-13) with other ATM address (fig. 1, plurality of ATM destination routers 14,16, and 18, recited in col. 3, lines 44-53).

Holmgren '512 discloses all the claimed limitation with the exception of being silent with respect to claimed features:

Regarding claim 17, instructions for guaranteeing that only one virtual circuit is set up between the node an the other ATM addresses; instructions for generating a PNNI Topology State Element (PTSE) including a service information group (IG), the service IG indicating the service ID and an ATM address to be associated with the service; instructions for flooding the service IG throughout the PNNI hierarchy by generating at least one message, each message containing at least two PTSEs; the instructions for guaranteeing that only one virtual circuit is set up between the node and the other instructions for establishing a mesh of virtual circuits to emulate VPLS by attaching virtual circuits to pairs of PEs, each of the pairs of PEs in the mesh comprising a first PE and a second PE, wherein the instructions for establishing each virtual circuit between the first PE and the second PE further comprise:

However, Stone '057 from the same field of endeavor discloses the above claimed features:

Regarding claim 17, instructions for guaranteeing that only one virtual circuit is set up between the node and the other ATM addresses (noted: establishing of a virtual circuit in response to a request for virtual connections to ATM destination switches, col. 6, lines 1-12, lines 31-51); instructions for generating a PNNI Topology State Element (PTSE) (noted: sharing of topology information including switch identifiers and VLAN information, col. 2, lines 38-48, "means to advertise topology information", col. 5, lines 27-39) including a service information group (IG) (see, path cost values indicating of bandwidth for sending topology messages, col. 5, lines 30-39, col. 9, lines 24-41), the service IG

indicating the service ID and an ATM address to be associated with the service (noted: VLAN switches with unique identifier, col. 5, lines 1-20+, fig. 4, VLAN ID, col. 9, lines 34-41); instructions for flooding the service IG throughout the PNNI hierarchy by generating at least one message, each message containing at least two PTSEs (see, topology messages encoded with VLAN Ids, switches' Ids and path costs, col. 5, lines 27-39); the instructions for guaranteeing that only one virtual circuit is set up between the node (noted: establishing of a virtual circuit in response to a request for virtual connections to ATM destination switches, col. 6, lines 1-12, lines 31-51) and the other instructions for establishing a mesh of virtual circuits in the ATM network to emulate VPLS by attaching virtual circuits to pairs of PEs (see, establishing of a full mesh of virtual connections from source switches to destination switches with VLAN identifiers, col. 3, lines 32-43), each of the pairs of PEs in the mesh comprising a first PE and a second PE (fig. 1, Edge switches 10, 40 in the ATM network), wherein establishing each virtual circuit between the first PE and the second PE (see, establishing of a full mesh of virtual connections from source switches to destination switches with VLAN identifiers, col. 3, lines 32-43) comprises:

In view of the above, having the method for Ethernet VLAN services over an ATM network of Holmgren '512, the method for maintaining and configuring connectivity in an ATM network based on topology messages with encoded with VLAN Ids of Stone '054, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the features of Holmgren '512 by using features as taught by Stone '057 in order to provide virtual

connections whereby topology information/messages are shared as suggested in col. 2, lines 37-48 for motivation.

Regarding claim 19, Holmgren '512 discloses the node further comprising: the VPLS ID and the ATM address to be associated with the VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45).

Regarding claim 20, Holmgren '512 discloses the node (fig. 1, Edge devices 28,30 and 32, recited in col. 3, lines 44-53), wherein the instructions for advertising the association between the ATM address("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45), and the VPLS ID ("VLAN tag", recited in col. 2, lines 27-36).

Holmgren'512, and Stone '057 disclose all the claimed limitation with the exception of being silent with respect of claimed features:

Regarding claim 19, flooding the IG.

Regarding claim 19, flooding the IG ("flooding of VC-label to every PE device", recited in paragraph 0027, lines 1-14).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Holmgren '512 with Stone '057 by using features as taught Kermarec '268 in order to provide virtual private LAN service by establishing a virtual circuit at the provider edge device as suggested in paragraph 0017 for motivation.

Holmgren'512, and Stone '057, Kermarec '268 disclose all the claimed limitation with the exception of being silent with respect of claimed features:

Regarding claim 19, the node of a Private Network-Network Interface (PNNI) hierarchy, and instructions for generating a PNNI Topology State Element (PTSE), instructions for generating a PNNI augmented Routing (PAR), instructions for flooding the PAR service IG throughout the ATM network.

Regarding claim 20, instructions for delivering to a second node using Proxy PAR.

However, Frelechoux '163 from the same field of endeavor discloses the above claimed features:

Regarding claim 18, node that is part of Private Network-Network Interface (PNNI) hierarchy, instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for generating a PNNI Topology State Element (PTSE) ("flooding PTSE back down to child groups", recited in paragraph 0046, lines 3-19), including a VPLS information Group, the VPLS IG indicating the VPLS ID and the ATM address, instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for flooding ("flooding of PTSEs", recited in paragraph 0003, lines 7-16) the PTSE throughout a peer group ("peer group of the node", recited in paragraph 0003, lines 1-14) of the node (fig. 2, Peer Group 88 of Logical Node Group 1.12, recited in paragraph 0045, lines 11-18).

Regarding claim 19, the node (fig. 1 and fig. 2, LGN1.0, recited in paragraph 0045, lines 5-18) of a Private Network-Network Interface (PNNI)

hierarchy (fig. 1, PNNI level 64, recited in paragraph 0045, lines 5-18) , and instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for generating ("generation of PTSEs and flooding", recited in paragraph 0003, lines1-7 and 11-21) a PNNI Topology State Element (PTSE) ("PNNI", recited in paragraph 0003, lines 1-7, and fig. 2, PPNI levels 64 and 72, recited in paragraph 0040, lines 7-17), instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for generating ("generated of protocol information by PAR enabled device-PNNI-PAR", recited in paragraph 0031) a PNNI augmented Routing (PAR)("PNNI PAR", recited in paragraph 0031), instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for flooding ("advertise IP information by flooding PAR PTSEs", recited in paragraph 0041) the PAR service IG throughout the ATM network ("advertised in the ATM network up to PNNI level", recited in paragraph 0042, lines 1-8).

Regarding claim 20, instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for delivering ("forwarding information", recited in paragraph 0043, lines19-21) to a second node (fig. 2, LGN 2.1.1, "Logical Group Node 2.1.1", recited in paragraph 0043) using Proxy PAR ("forwards of information, flooding via Proxy-PAR", recited in paragraph 0043).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Holmgren'512 with Stone '057, Kermarec '268 by using features as taught by

Frelechoux '163 in order to provide managerial function in PAR enabled device as suggested in paragraph 0009-0012.

The combination of Holmgren '512, Stone '057, Kermarec '268, Frelechoux '512 discloses all the claimed limitations with the exception of claimed features:

Regarding claim 17, instructions for selecting the first PE and the second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, instructions for determining whether the first or the second should initiate the virtual circuit; and instructions for automatically establishing the virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 17, instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to the second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10),

instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for automatically establishing the virtual circuit between the first PE and the second PE using the respective ATM address of the first PE and the as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, having the combined teaching features of'512, Stone '057, Kermarec '268, Frelechoux '512, the ATM edge switching for establishing VPN connection based on the quality of service type of Sugiyama '954, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Holmgren '512 with Stone '057, Kermarec '268 and Frelechoux '512 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ould-brahim et al (US 2003/0177221 A1) and Kim et al (US 2004/0037296 A1).

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CANDAL ELPENORD whose telephone number is (571) 270-3123. The examiner can normally be reached on Monday through Friday 8:00AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Bin Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Candal Elpenord/
Examiner, Art Unit 2473

/KWANG B. YAO/
Supervisory Patent Examiner, Art Unit 2473